ZERO CARBON HUB

NHBC FOUNDATION

Housing research in partnership with BRE Trust

ENERGY PERFORMANCE OF BUILDINGS DIRECTIVE

INTRODUCTORY GUIDE TO THE RECAST EPBD-2

April 2011

Zero Carbon Hub

The Zero Carbon Hub was established in the summer of 2008 to support the delivery of zero carbon homes from 2016. It is a public/private partnership drawing support from both Government and the Industry and reports directly to the 2016 Taskforce.

The Zero Carbon Hub has developed five workstreams to provide a focus for industry engagement with key issues and challenges:

- Energy Efficiency
- Energy Supply
- Examples and Scale Up
- Skills and Training
- Consumer Engagement

To find out more about these workstreams, please visit **www.zerocarbonhub.org.**

If you would like to contribute to the work of the Zero Carbon Hub, please contact **info@zerocarbonhub.org**

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NHBC Foundation

Housing research in partnership with BRE Trust

The NHBC Foundation was established in 2006 by NHBC in partnership with the BRE Trust. Its purpose is to deliver high-quality research and practical guidance to help the industry meet its considerable challenges.

Since its inception, the NHBC Foundation's work has focused primarily on the sustainability agenda and the challenges of Government's 2016 zero carbon homes target. Research has included a review of microgeneration and renewable energy techniques and the groundbreaking research on zero carbon and what it means to homeowners and housebuilders.

The NHBC Foundation is also involved in a programme of positive engagement with Government, agencies, academics and other key stakeholders, focusing on current and pressing issues relevant to the industry.

Further details of the latest output from the NHBC Foundation can be found at **www.nhbcfoundation.org**

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The observations and views expressed in this report are offered to help explain the EPBD in the UK context. We have endeavoured to report the current position as accurately as possible, but stress that the document is an interpretation of a complex legislative interface. The Zero Carbon Hub welcomes comments on the document which might inform future editions.

Acknowledgement

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1 Introduction

Buildings account for 40% of total energy consumption in the European Union. The indications are that this will increase, simply because of growth in the number of buildings over time. As a result, if the Union is to reduce its energy dependency and greenhouse gas emissions, it is essential that the energy consumption per building is reduced, and that the proportion of energy from renewable sources is increased.

There have been two Energy Performance of Buildings Directives (EPBDs) adopted by the European Parliament and Council. They aim to reduce energy consumption in both the residential and non-domestic sectors by raising awareness of energy use, mandating minimum standards, and requiring inspections of key plant. It seems likely that the Directives will lead to substantial increases in investment in energy efficiency measures within relevant buildings.

This report highlights the actions (Articles) proposed by the first and second EPBDs, giving special attention to the interpretation of EPBD-2 in the UK context.

Note: throughout this report, references to the Building Regulations Part L, which apply to England and Wales, should also be construed as meaning Part F (Northern Ireland) and Section 6 (Scotland).

2 Purpose of EPBD

Under the Kyoto protocol of 1997, the European Union was required to make greenhouse gas reductions of 8%, ie. to reduce its annual emissions by 330 million tonnes by 2008-2012. The original Energy Performance of Buildings Directive ('EPBD-1') was a core response to this target; when the Directive was adopted in December 2002 there were 160 million buildings in the EU, and it was anticipated that the Directive could deliver 45 million tonnes of carbon dioxide reduction by 2010.

By 2007 the EU had committed to even more stringent targets - in particular to a reduction of 20% in the Union's total energy consumption by 2020, and a binding target for renewable energy of 20% of total supply by the same year. Individual Member States have set their own national targets, which, if achieved, will total or exceed the EU target. For example, the UK is committed to a reduction in overall national carbon emissions of 80% by 2050, and the Government has indicated that in order to achieve this there must be a near-100% reduction in the emissions from buildings – both new and old, both residential and non-domestic.

Significantly, the 45 million tonnes of carbon dioxide reductions expected from EPBD-1 only amounted to 1% of the EU's total greenhouse gas emissions, and renewable energy sources only contributed 8% of total energy supply at that time - so clearly there was a need for a strengthening of the provisions of the Directive and a more thorough and rapid implementation. At the same time it was acknowledged that there had been a wide range of responses from Member States to the provisions of the original Directive, and that this variability should not be allowed to continue.

Hence the second directive (known as the 'recast EPBD' or 'EPBD-2') was drafted. This was adopted in May 2010, effectively replacing the original. It generally tightened up the performance standards, reduced the building size thresholds which trigger certain actions, and strengthened the requirements for display of information and inspection of plant. This report clarifies these changes.

3 Key features of EPBD-1

European Directives are normally expressed as a series of 'Articles' which lay out the actions or requirements. It is then up to Member States to pass national legislation which enacts the Articles, by the stated dates. In England and Wales EPBD-1 was incorporated in law through the European Communities Act, Part 5 of the Housing Act 2004, and various items of secondary legislation including the Building Regulations Parts L1 and L2.

Though it has effectively been replaced by EPBD-2, EPBD-1 is not formally repealed until February 2012 and the new Directive does not have to be in force nationally until 2013 (some of it not until 2015). Moreover, certain Articles of EPBD-1 only came into force in 2009, so at the time of writing even parts of EPBD-1 can still be considered to be bedding-in. For these reasons, and to provide cross references, the main Articles of EPBD-1 (more formally '**Directive 2002/91/EC of the European Parliament and of the Council**') are described in detail in the Appendix.

4 The recast Directive, EPBD-2

EPBD-2, formally '**Directive 2010/31/EU of the European Parliament and of the Council**', contains the following relevant Articles. Some of the Articles replace or amend EPBD-1 Articles, and others are new; their numbering does not necessarily correspond. These Articles are discussed further in the subsequent sections of this report.

Article 3 there must be a national calculation methodology.

Article 4 minimum energy performance requirements must be set.

Article 5 the EC will establish a framework for assessing cost-optimality.

Article 6 all new buildings must consider low- and zero-carbon technologies.

Article 7 all existing buildings (and individual building elements) must meet the standards of Article 4 when renovated.

Article 8 performance standards must be set for new and replacement 'technical building systems' (heating, hot water, air conditioning and large ventilation).

Article 9 the number of 'nearly zero-energy' buildings to be increased. Mandatory for newbuild (public sector soonest); non-mandatory targets and encouragement for existing buildings.

Article 10 list of financial incentives and barriers to improving energy performance must be drawn up.

Article 11 energy performance certificates (EPCs) must be issued at key stages of a building's life; public authorities must implement the recommendations.

Article 12 EPCs must be issued for construction, selling or renting, and in any case for public buildings. All sale and rental advertisements must include the headline energy performance indicator.

Article 13 public buildings (including smaller ones) must display their EPCs.

Article 14 larger boilers must be inspected, or advice given.

Article 15 larger air-conditioning systems must be inspected, or advice given.

Article 17 only qualified and accredited independent experts may fulfil Articles 11, 14 and 15.

Article 18 independent QA systems must be established for certification and inspections.

Article 20 mandatory information campaigns on enhancing buildings' energy performance; training must be made available.

Article 21 stakeholders must be consulted, especially re. nearly zero-energy buildings.

Article 27 penalties for non-compliance must be introduced.

5 What are the calculations and definitions used?

For housing, the UK's BREDEM-9 model (SAP) has long been compliant with EPBD-1. With the latest 'SAP 2009' additions (non-repeating thermal bridges, etc) and various future enhancements already identified by the Zero Carbon Hub (notably the modelling of thermal comfort/overheating)[1], it should be compliant with EPBD-2.

For non-domestic buildings there are several approved commercial models available (eg. Hevacomp, IES, TAS), and the Government-developed SBEM is in the public domain. Some development work will be required in order to ensure full compliance of any of these models with EPBD-2.

There seems to be little need to re-define the energy performance certificate or display energy certificate (DEC) for EPBD-2, although there is some debate over whether or not public buildings will henceforth have to display an operational rating (ie. DEC) or merely an asset rating (design-stage EPC).

The requirements of EPBD-2 are generally set in the context of cost-effectiveness, and while the EC has an obligation to set out a framework for assessing 'cost-optimality' [2] it is up to the Member States to define the details.

Arguably the most significant new definition in EPBD-2 is that of a 'nearly zero-energy' building. This is discussed in detail in section 7.

6 What are the requirements for new homes?

- Minimum performance requirements must be set, and must be cost-optimal. The UK is essentially compliant via Building Regulations Part L1A.
- Generally, the Directive only mandates that standards must be set – it does not mandate the level of the standards. However, there is also a requirement that all new buildings must be nearly zero-energy by 2020 (public authorities' buildings by 2018). The intention that new UK housing will be zero-carbon from 2016 does in principle comply (and is not affected by the 2011 Budget redefinition of zero-carbon); this is discussed further in section 7.
- Member States can decide not to apply the nearly zero-energy requirement *in specific and justifiable cases* if it is deemed to have a negative cost-benefit analysis.
- At pre-construction stage, for all buildings regardless of size, consideration must be given to 'alternative high-efficiency systems', particularly district heating and renewable energy systems.
- Optionally, technical building systems (heating, hot water, air conditioning and large ventilation systems) must meet performance requirements which include their intrinsic energy performance, sizing, installation and commissioning.
- Intelligent meters and active control systems must be encouraged.
- An energy performance certificate is to be issued whenever a building is constructed. The EPC must include current legal standards and benchmarks.
- The EPC's headline indicator must appear in all advertisements when selling.

[1] http://www.zerocarbonhub.org/resourcefiles/CARBON_COMPLIANCE_GREEN_OVERVIEW_18Aug.pdf

[2] A set of measures is cost-optimal if their cost-benefit analysis over the economic lifecycle of the building is positive.

7 How does the emerging definition of zero carbon new homes align with the EPBD?

To quote the Directive, a nearly zero-energy building is defined as one that has "*a very high energy performance*", and for which "*the nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced onsite or nearby*". Clearly this leaves a lot of room for interpretation, and a key consideration is whether or not the UK's 'triangular' policy definition of a zero carbon home (Figure 1) is compliant, or at the very least is a suitable proxy (noting the distinction between carbon and energy). Figure 1 also shows a 'triangular' representation of the EPBD-2 energy terminology to draw out the broad parallels and distinctions.

Indications to date are that individual Member States will be free to define "*very high energy performance*". So, for England and Wales, it can be argued that even the bottom slice of the zero-carbon policy triangle corresponds to a "*nearly zero or very low amount*" of energy, in particular when compared to the total consumption of, say, a typical Victorian terraced house. It can also be argued that Carbon Compliance (at the levels proposed for England and Wales - meets the Directive's requirement that the remaining energy demand is "*covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby*".

Interestingly, and depending on the exact interpretation of "*covered to a very significant extent*", it can therefore also be argued that the emerging definition meets the EPBD-2 requirements even without consideration of the Allowable Solutions slice of the triangle. In practice this could give the development of Allowable Solutions a flexibility to permit investments in off-site renewable capacity or other methods of mitigating carbon emissions (a number of which have been explored as possible options). More information on Allowable Solutions is now available [3].

Another important observation is that the post 2011 Budget definition of zero carbon has closer parity with the EPBD-2 equivalent, because both now relate to regulated energy alone (and not to the unregulated part of energy use).

Conclusion

From this examination it seems safe to conclude that the UK's emerging definition (including the changes introduced in the 2011 Budget) will comply with EPBD-2 in principle, provided:

(i) the case is made that 'zero carbon' is a fair proxy for 'zero energy',

(ii) the body responsible for finalising the Allowable Solutions arrangements ensures alignment with the renewable energy requirements of EPBD-2,

(iii) a primary energy indicator expressed in kWh/m^2/yr is incorporated for each slice of the zero carbon policy triangle,

(iv) the corresponding supporting work for non-domestic buildings proceeds in parallel,

(v) the zero carbon definition framework is applied consistently for existing buildings as well as newbuild.

[3] http://www.zerocarbonhub.org/resourcefiles/Allowable_Solutions_for_Tomorrows_New_Homes_2011.pdf

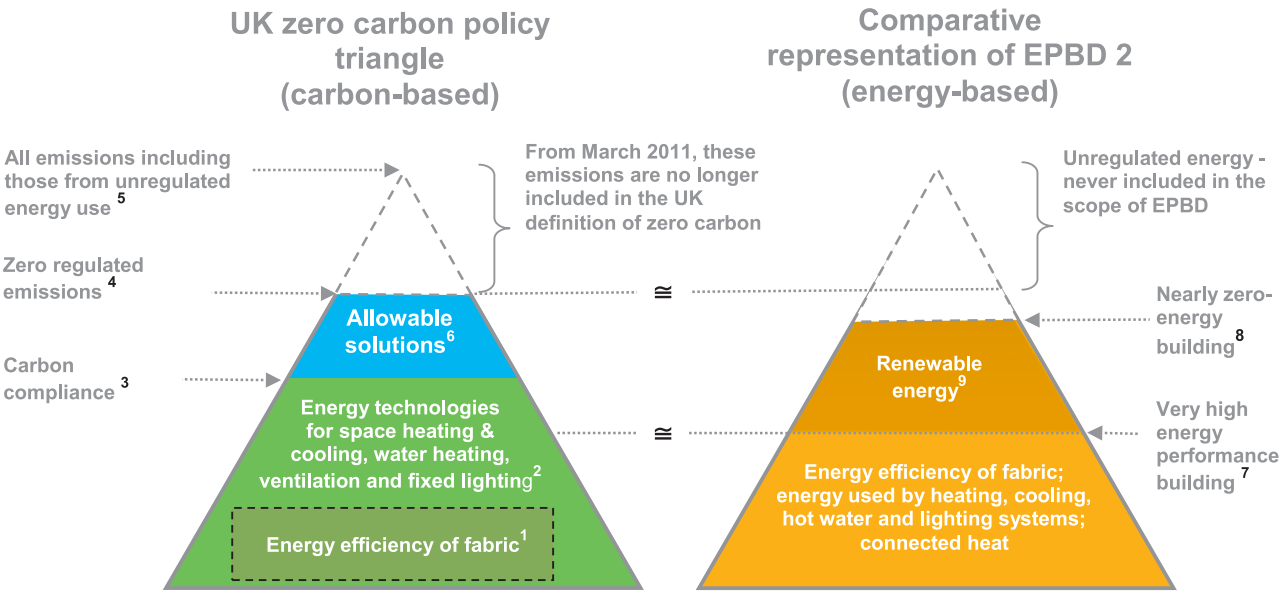

Figure 1 Comparison of the UK and EPBD approaches

Notes on the UK carbon-based policy

[1] This is the Fabric Energy Efficiency Standard (FEES) published by the Zero Carbon Hub in November 2009 (and accepted as a minimum fabric standard for 2016 Part L – the 'zero carbon' Building Regulations).

[2] These will typically be low or zero carbon technologies but 'standard' technologies may be included as part of the strategy.

[3] Carbon Compliance is the maximum permitted amount of CO_2 arising from the heating, cooling, hot water, fixed lighting and ventilation of a home which complies with Part L 2016. Current recommendations published by the Zero Carbon Hub in January 2011 propose that carbon compliance values of 14, 11 or 10 kg CO_2/m^2/year (depending on built form) should not be exceeded. These Carbon Compliance levels take a home part way (as far as practically feasible) towards the overall zero carbon policy target (see 4 below).

[4] Zero regulated emissions is the post-2011 Budget policy target for a zero carbon home. To achieve this overall target, CO_2 emissions from all energy used in heating, cooling, hot water, ventilation and fixed lighting must be accounted for. Current thinking is that this will be achieved by meeting the Carbon Compliance level and by mitigating the balance with Allowable Solutions.

[5] Zero total emissions. This was the pre-2011 Budget policy target for a zero carbon home. As well as all the CO_2 from regulated energy (listed in 4 above), it also included the significant emissions from unregulated energy use (ie. plug-in appliances and cooking).

[6] Allowable Solutions are as yet undefined, but are intended as a mechanism for mitigating the carbon emissions that cannot normally be eliminated on-site through Carbon Compliance. They are expected to include on-site (not duplicating Carbon Compliance), near-site and off-site carbon-reduction projects, including renewable energy generating projects.

Notes on the EPBD energy-based approach

[7] Very high energy performance building. This term indicates that a very low amount of energy is required to meet the energy demand associated with the use of the building. It includes the energy needed for heating, cooling, ventilation, hot water and lighting – broadly the equivalent of 'regulated energy' in UK terminology.

[8] Nearly zero-energy building. This term implies that there may be a very small amount of regulated energy required by the home that is not met by renewable energy (see 9).

[9] Renewable energy. The Directive suggests that renewable energy should provide a "very significant" proportion of the residual regulated energy requirements of the home, from sources either onsite, nearby, or remote from the site. EPBD accepts that the top of the brown shaded area may not always reach the zero regulated energy line.

8 What are the requirements for new non-domestic buildings?

The requirements are essentially the same as for new homes (see section 6 above), with the following additions. UK compliance is mainly via Building Regulations Part L2A.

- All public buildings over 500m^2 total useful floor area (TFA) and all buildings frequently visited by the public must display their current energy performance certificate in a prominent place clearly visible to the public [4]. Debates continue in the UK about the definition of 'public buildings' and the low level of compliance.
- Under EPBD-1, for non-domestic public buildings, two types of certificate were created: the 'asset rating' or design-stage EPC, and the 'operational rating' or Display Energy Certificate (DEC) which is based on measured energy consumption over the previous year. It appears that EPBD-2 has relaxed the requirement to display a current DEC, allowing the EPC to be displayed instead.
- The EC will establish a voluntary harmonised certification scheme for non-domestic EPCs.

9 What about existing buildings?

- Minimum performance requirements to be set for whole buildings or building units when renovated, and also for the replacement / retrofitting of building envelope *elements*. It is up to Member States whether the requirements apply to the whole building or just the renovated part; the UK complies via the Building Regulations Parts L1B and L2B, which in principle can include requirements for 'consequential improvements [5].
- The performance requirements apply to *all sizes* of building, but only where the requirements are technically, functionally and economically feasible.
- Non-mandatory measures and targets must be put in place to stimulate higher refurbishment rates to increase the number of nearly zero-energy buildings. Note that, as previously discussed, in order for the UK to achieve a national emissions reduction of 80% by 2050, all buildings (new *and* existing) must have near-zero emissions by then [6]. Technical building systems (heating, hot water, air conditioning and large ventilation systems) must meet performance requirements which include their intrinsic energy performance, sizing, installation and commissioning. This is not optional (as it is for new buildings).
- Intelligent meters and active control systems must be encouraged.
- An energy performance certificate is to be issued whenever a building is sold or rented out. The EPC must include current minimum standards, along with recommendations for the cost effective improvement to the energy performance of the building and its individual elements.
- EPCs must also be issued for all public buildings over 500m^2 TFA and all buildings frequently visited by the public, regardless of change of tenancy or owner.
- The EPC must be no more than 10 years old, and the headline indicator must now appear in all advertisements when selling or renting.
- Public authorities are required to lead the way by actually implementing the EPC's recommended improvement measures for their buildings.

[4] The threshold reduces to 250m^2 in 2015. Under EPBD it was 1,000m^2.

[5] although successive Governments have been reluctant to implement them.

[6] See foreword and pages 3 and 17 of HESS: http://hes.decc.gov.uk/consultation/download/index-5469.pdf

10 What are the inspection requirements?

Heating system inspections

EPBD-2 extends the requirements to include all accessible parts, including boilers, controls and pumps. Governments have two options:

Either

(a) Ensure inspections as follows:

- Boilers with rated output between 20-100kW: regular inspection.
- Boilers over 100kW: inspection every two years (four years in the case of gas).
- Inspections to include an assessment of the boiler efficiency and size, and recommendations for cost-effective improvements.
- Inspections may be less frequent if electronic control and monitoring systems are installed.

Or

(b) Ensure the provision of advice to users on the replacement of the boilers, other modifications to the heating system and on alternative solutions. Produce a report every three years (previously two) showing how this achieves as much as implementing the Article under option (a).

It is reasonable to assume that the UK will continue to comply via the advice option.

Air conditioning systems inspections

Governments now have two options:

Either

(a) Ensure regular inspections of all air conditioning systems with a rated output of more than 12kW. Inspections must include an assessment of the efficiency and sizing of the system, and recommendations for cost-effective improvements. They may be less frequent if electronic control and monitoring systems are installed.

Or

(b) Ensure the provision of advice to users on the replacement of the air conditioning system and other modifications to the system. Produce a report every three years showing how this achieves as much as implementing the Article under option (a).

It is as yet unclear how the UK will choose to comply, because the advice option was not available for air-conditioning under EPBD-1, yet it was clearly the Government's preference for boilers.

11 What else needs to happen?

- A list of **financial incentives and market barriers** must be drawn up, and reported three-yearly.
- Certification and inspections must be carried out by **independent and qualified/accredited experts,** and there must be an **independent control (QA)** system for certification and inspection reports. The UK's complex landscape, which comprises accreditation schemes, National Occupational Standards, awarding bodies and a series of qualifications (Home Inspector, Domestic Energy Assessor, On-Construction Domestic Energy Assessor, Commercial Energy Assessor, etc), is compliant. Discussions are currently underway about whether the Green Deal refurbishment programme requires another new qualification (Home Energy Advisor).
- Member States must (no longer 'may') run **information campaigns** for building users on how to enhance their energy performance. Training and guidance must be available to those responsible for implementing energy reduction.
- Member States must set up and enforce **effective and dissuasive penalty rules for non-compliance**.
- National rules for implementing EPBD-2 must be published by mid-2012. These rules, along with the corresponding systems and penalties, **must be in force by early- to mid-2013** [7].

Some practical considerations related to ongoing EPBD compliance

At this point the UK Government has signified that it will not be participating in the industry-led Directive Implementation Advisory Group (DIAG) as it did for EPBD-1. A number of tasks may however be regarded as needing ongoing executive steer and support, in particular:

(i) Ensuring that the Allowable Solutions are EPBD-2 compliant.

(ii) Continuing the development of a definition of zero carbon for non-domestic new buildings and existing buildings.

(iii) Ensuring that the necessary SAP modifications are carefully specified and funded.

[7] except EPCs for rented single building units, which may be deferred until the beginning of 2016.

Appendix The EPBD-1 Articles

The main Articles of EPBD-1 are listed and then discussed in more detail below:

EPBD-1 Article 3	there must be a national calculation methodology.
EPBD-1 Article 4	minimum energy performance requirements must be set.
EPBD-1 Article 5	all new buildings must consider low- and zero-carbon technologies.
EPBD-1 Article 6	larger existing buildings (and individual building elements) must meet the standards of Article 4 when renovated.
EPBD-1 Article 7	energy performance certificates (EPCs) must be issued at key stages of a building's life. Larger public buildings must display their certificates.
EPBD-1 Article 8	larger and/or older boilers must be inspected, or advice.
EPBD-1 Article 9	larger air-conditioning systems must be inspected.
EPBD-1 Article 10	only qualified and accredited independent experts may fulfil Articles 7, 8 and 9.
EPBD-1 Article 12	optional information campaigns on enhancing buildings' energy performance.

EPBD-1 Article 3 Adoption of a methodology

A national or regional methodology must be adopted for the calculation of energy performance (in effect, a mathematical model). The model must take into account the fabric, building services and indoor and outdoor climate. It must also be capable of modelling passive solar features and natural ventilation.

The model must also handle renewable energy sources, daylighting, CHP, and district/block heating and cooling. It may (note: '*may*', not 'must') include a CO2 indicator, although this was deemed by the UK Government to be desirable.

For housing the UK chose to adapt the established BREDEM-9 model (SAP) to a state of full compliance. For non-domestic buildings there are several approved commercial models (eg. Hevacomp, IES, TAS), and the Government also developed SBEM and placed it in the public domain. The model(s) must be reviewed at least every two years.

Corresponding EPBD-2 Article: 3

EPBD-1 Article 4 Setting of energy performance requirements

Minimum performance requirements must be set, for both new and existing buildings (see distinction in Articles 5 and 6 below). Certain categories of buildings (places of worship, temporary structures, very small buildings, etc) are exempt. The Directive only mandates that standards must be set – it does not mandate the *level* of the standards.

The UK was effectively compliant long before the directive was adopted, thanks to the existence of its Building Regulations Approved Documents Parts L1 and L2.

Corresponding EPBD-2 Article: 4

EPBD-1 Article 5 New buildings

For new buildings larger than 1,000m^2 TFA, the technical, environmental and economic feasibility of certain low- and zero- carbon systems (renewables, CHP, district heating and heat pumps) must be considered prior to construction.

In addition to Building Regulations Part L2A, UK initiatives such as the Feed-In Tariffs, Enhanced Capital Allowances and the Merton Rule effectively implement this Article.

Corresponding EPBD-2 Article: 6

EPBD-1 Article 6 Existing buildings

Whenever buildings larger than 1,000m^2 TFA undergo major renovation, their energy performance must be upgraded in line with Article 4 "insofar as it is technically, functionally and economically feasible".

Building Regulations Part L2B potentially include requirements for 'consequential improvements'.

Corresponding EPBD-2 Article: 7

EPBD-1 Article 7 Energy performance certificates

Whenever a building is *constructed, sold or rented out*, a certificate detailing its energy performance must be made available to the owner or the prospective buyer/tenant as appropriate. This energy performance certificate (EPC) must include **current legal standards and benchmarks**, along with **recommendations for the cost effective improvement** of the building's energy performance. Certificates must be no older than 10 years.

All buildings over 1,000 m^2 TFA occupied by either (a) a public authority or (b) an institution providing a public service and frequently visited by a large number of people, must display their current energy performance certificate in a prominent place clearly visible to the public. There has been much debate in the UK about the definition of 'public service'.

For residential buildings this Article was originally transposed via Building Regulations and the Housing Act 2004, which mandated the inclusion of an EPC in the Home Information Pack from 2007. When the HIP was abolished in 2010 the requirement for providing an EPC remained. Housing landlords must also provide an EPC to all new tenants.

For non-domestic public buildings, two types of certificate were created – the 'asset rating' or EPC, and the 'operational rating' or Display Energy Certificate (DEC). DECs are valid for 1 year and are based on measured energy consumption. At the time of writing there is considerable doubt as to the level of compliance in the UK, some observers quoting less than 30% of DECs being displayed.

Corresponding EPBD-2 Articles: 11, 12, 13

EPBD-1 Article 8 Inspection of boilers'

Governments have two options for ensuring that boiler inspections are carried out.

Either

(a) Ensure inspections of plant as follows:

- Boilers with rated output between 20-100kW fuelled by non-renewable liquid or solid fuel: regular inspection.
- Boilers over 100 kW: inspection every two years (four years in the case of gas),
- Boilers over 20 kW and over 15 years old: one-off inspection of the entire heating installation, also to include:
    - an assessment of the boiler efficiency and size, and
    - advice on the replacement of the boilers, other modifications to the system and alternative solutions.

Or

(b) Ensure that there is adequate provision of advice to users on the replacement of the boilers, other modifications to the heating system and on alternative solutions.

This may include assessment of the efficiency and appropriate size of the boiler. No regular timescale is required for this advice, but if Governments choose this means of complying, they have to produce a report every two years showing how this achieves as much as implementing the Article under option (a).

The UK opted to comply under option b), and to work with the Energy Saving Trust, the Carbon Trust and others to develop a method for the biennial reporting of effectiveness.

Corresponding EPBD-2 Article: 14

EPBD-1 Article 9 Inspection of air conditioning systems

Governments must ensure regular inspections of all air conditioning systems with a rated output over 12 kW. Inspections must include an assessment of the efficiency and sizing of the system, and advice must be provided on possible improvements, replacements and alternative solutions.

Corresponding EPBD-2 Article: 15

EPBD-1 Article 10 Independent experts

EPCs, DECs and plant inspections must be carried out in an independent manner by qualified and/or accredited experts. This led in the UK to a complex landscape comprising accreditation schemes, National Occupational Standards, awarding bodies and a series of qualifications (Home Inspector, Domestic Energy Assessor, On-Construction Domestic Energy Assessor, Commercial Energy Assessor, etc). Accreditation of an individual includes their education/training, experience, record keeping, insurance, complaints procedures and ongoing continuous professional development.

Corresponding EPBD-2 Articles: 17, 18

EPBD-1 Article 12 Information

Member states may choose to run information campaigns for building users on how to enhance their energy performance. The EC will assist, upon request.

Corresponding EPBD-2 Article: 20

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